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The purpose of this document was to generate a rationale and a design for planning a conceptual basis for developing common curriculums in vocational teacher education training programs. A review of the literature discusses heuristic approaches to teacher education, the rational basis for common programs, empirical studies in teacher education, approaches to determine content and behaviors of common programs, and the direction of research in vocational teacher education. The proposed research model would have the objectives of (1) determining the content of professional education needs for teachers of vocational subjects, (2) determining the competency levels required, and (3) extracting the common core of subject matter for professional education needs and training elements to terminally develop a listing of common needs for vocational teachers. The general design of the proposed approach is patterned after previous studies, but is modified to include (1) a population of vocational teachers representing five disciplines, (2) a factor analysis, and (3) an analysis of the data by the analysis of variance--the test statistic is the F statistic, and the critical region for the test of the hypothesis is the theoretical value for indicated degrees of freedom at the 1 percent level of significance. (MM)

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A Conceptual Basis For Developing Common Curricula in Teacher Education Programs For Occupational Education

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January, 1968

PREFACE

The matter of teacher education has been characterized by many problems and much controversy regarding how and what should be contained in the training program. The present paper is one which outlines a position for developing common curricula for teachers of vocational subjects. The unique element of the present position is that it establishes an empirical basis for approaching the problem.

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January, 1968

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INTRODUCTION

During the past two decades, a decided change in emphasis has taken place in regard to the aim of the school and the manner in which teachers can best be trained for their roles in the school. During that time when the specific aim of the school was focused on the student and his emctional development, the professional aspects of teacher preparation were stressed. As the point of emphasis changed to the intellectual development of the child, the academic aspect of teacher preparation received greater emphasis (Deutsch, 1964). From the late 1950's to the present time, the emphasis on academic preparation has grown but at the same time, many educators have given much thought to strengthening and enriching professional work.

Evidence reveals a gradual reduction in the number of professional course hours required of future teacher trainees and for teacher certification. Johnson (1964), in a study involving the development of secondary teacher education programs in Ohio's state universities, has pointed out that,

> While increased interest has developed through the years in the general and specialized education of secondary teachers, this interest has been of a less precise nature than that given the professional sequence. The evidence further shows that little difference exists between the professional programs in the state universities and recent recommendations of such critics as Conant and Koerner.

In another study (Lyon, 1966), which investigated the trends and practices of programs for the preparation of secondary teachers, recommendations cited that the teacher education candidate should be provided with opportunities to gain proficiency in the basic areas of:

1. knowledge of the learner.
2. knowledge of the processes of learning.

3. methods and materials of teaching to include testing, measurement, and evaluation, and A-V-L (audio-visual-lingual) approaches.

4. social foundations and purposes of education.

5. curriculum of the secondary school.

6. practical application of teaching procedures at the secondary level.

First year problems of great or some concern to teachers are likely concentrated in the areas of (cf. Theune, 1960):

1. teaching subject matter.

2. personal consideration for students.

3. classroom organization.

4. discipline.

5. testing and measurement.

Heuristic Approaches to Teacher Education

There have been several suggested approaches for meeting the demands of modern teacher education requirements which provide rational bases for looking at the problem. Four approaches have been outlined below which illustrate the diverse opinions existing among educational planners regarding the way teachers should be trained. Each point of view is stated separately.

1. The Perceptual Viewpoint. Our changing social needs as well as our new understandings about human behavior and learning has lead Combs (1965) to develop a viewpoint on which to base thinking and experimentation in teacher education. Based upon theory provided by modern existential psychology, Combs indicates that teacher education programs must be concerned with persons, rather than competencies. Under this approach, individualization of instruction is

suggested as a necessity.

For some time, educators have been concerned about which competencies and what content should be emphasized in teacher training programs. Combs points out that it is apparent that teaching prospective teachers about how they ought to behave is no guarantee that they will exhibit that behavior once they are on their own. This approach promises that the modification of a trainee's perceptions of the teaching act will have a more meaningful effect upon his expected behaviors under differing situations than will training which merely illustrates "good" or "bad" techniques of teaching. The perceptual viewpoint takes into account people, situations, and purposes, with the teacher being trained to use himself in solving problems with which he is confronted as he practices his profession. Such a perceptually-oriented teacher will adjust his behavior to meet the immediate needs in the classroom. Thus, the teacher is placed in a role which presents tasks of ministering to the processes of facilitation and encouragement in his relationships with students rather than to the presently emphasized processes relating to prescription and coercement.

The implementation of training programs to facilitate the perceptual approach would demand a shift in emphasis from content to the learner. Here the learner would be attracted to the center of the teacher preparation curriculum with the program organized in such a fashion so that it would (1) permit the movement of students at different speeds, (2) provide content and experience in response to student needs, (3) provide simultaneous experiences for the learner, and (4) place much more responsibility for training upon the student himself. Under Comb's outline, the content required for general education would be broader than at present with a re-examination of the same

content sometimes being necessary in order that the trainee obtain a deeper and more personal meaning of the information.

The University of Florida is presently attempting to identify the kinds of perceptions which good professional workers possess. If teacher educators are to be concerned about changing the perceptions of teacher trainees, clear definitions of the perceptual organizations of effective teachers are essential. As perceptions are identified, perhaps an empirical basis for teacher education which is based upon this viewpoint can be established.

2. The Roles Viewpoint. Many attempts have been made to find a general formula for describing the characteristics of a good teacher. Currently the emphasis in education is on the logical structure of subject matter, an emphasis which might well be sound in light of the goal of understanding on the part of the learner. In any case, however, there still remains the absence of a foundational theory upon which to develop the discipline of education. The roles approach, as described by Broudy (1965) (1967), focuses upon the examination of problems of practice that are distinctive to education as a profession.

This approach looks in the direction of the requirements of the roles played by teachers (1) as members of the education profession, and (2) as specialists in that profession. According to this definition, a profession "rests heavily on a body of systematized knowledge organized in terms of distinctive problems of practice (Broudy, 1965)."

Broudy's viewpoint places knowledge into foundational types and specialization types with the first being needed by all workers in the education profession regardless of their role in the educational system. The specialization types of training would be given to differentiate among various jobs for which trainees are oriented within the profession.

The basis for the roles viewpoint relates itself to the identification of the body of knowledge and skill which must be mastered through formal training in order to turn out competent teachers. The roles played by the teacher as a professional worker may play an important function in determining the design for the professional education curriculum.

3. The Competency Viewpoint. One of the more intensive studies of teacher education has been conducted by Conant (1963) and his report has been widely read. Among other things, Conant discusses the matter of time distribution for subjects taken by trainees during their preservice programs. Throughout his discussion, the matter dealing with the importance of the level of competence attained by the teacher trainee is stressed. Conant feels so strongly about this competency factor that he argues that a comprehensive examination should be given to trainees during their senior year of work.

The development of teachers who are highly competent in a subject area requires that a considerable amount of the training time be devoted to the study of the specialty subject. Through such an arrangement, however, the trainee is able to go beyond the introductory level and gain a coherent picture of the subject. Through such training, the teacher trainee would likely grasp satisfactions of the subject which he could relate to his future pupils. The competency approach would do away with majors and minors, replacing them with "concentrations," with the concentrations being offered to the trainee in sequential steps.

Conant, like many others, has related that teacher educators have not yet discovered or agreed upon a common body of knowledge that they all feel should be held by teachers as they matriculate from

pre-service training. Further, he relates that there is no conclusive research proving beyond reasonable doubt the superiority of one pattern of teacher education over another.

4. The Conceptual Viewpoint. Changes in sequence and content for training programs for teachers have been advocated and practiced among teacher educators as well as among training institutions. LaGrone (1964) has advocated that changes should be evaluated in terms of the adequacy of the teacher's conceptual scheme. This viewpoint is one which combines the power, function, and process of forming and evaluating alternatives which affect behavior with understandings, knowledge, and skills as they are related to behavior. LaGrone feels that the pre-service professional program should provide the concepts essential to such training.

The conceptual viewpoint maintains that much of the content which is offered to trainees is not vital to such programs and should therefore be critically analyzed in terms of it being essential to the training. Presently, with the professional content for teacher trainees divided among the several sub-divisions of education, much of the training material and experience is fragmented and non-integrated. According to LaGrone, an integrated element is needed in order to organize the body of knowledge essential to pre-service training. In developing such content, the instructional activities of the teacher appear to offer the most significant integrative element.

The conceptual scheme is the heurisitc approach which most closely parallels the suggested basis for developing common curriculums in teacher education programs for teachers of occupational subjects.

Summary

Keeping curriculum current is apparently the most difficult and,

perhaps, the greatest problem which faces vocational education today. For the present, as well as the future, every effort must be made to anticipate which changes should occur in the curriculum in order to meet the basic demands of the profession.

The present question is focused on the development of a unified design for vocational teacher education. Specifically, the problem is centered on the professional content definition for vocational teacher education and toward the following needs:

1. There is need for a broadly-based approach to teacher education program development with coordination and cooperation among teacher educators and cooperation among teacher educators and supervision and within teacher education and supervision, and within teacher groups.

2. There is need to examine what is good, sound, and satisfactory subject matter in the existing programs, and to build the future on the sound features of the present so that what is new is easily integrated with the acceptable existing program.

3. There is need to examine the professional competencies of teachers, to examine critically teacher education programs, and to inquire into how teacher education programs should be conceived.

4. There is need to define the professional behavioral structure of teachers of vocational subjects, to define desirable outcomes of teacher training programs, and to translate the curriculum into the outcomes.

RATIONAL BASIS FOR COMMON PROGRAMS

The thesis of commonality among vocational programs has been advanced of late by several researchers who have been concerned with the idea of identifying concepts common to all fields of vocational education (Cross, 1967), (Courtney, 1967), (Openshaw, 1966), and (Sjorgen and Sahl, 1966). The common concerns of the composite of vocational programs has also been reflected in the recent 1965 Sixty-fourth Yearbook of the National Society for the Study of Education, Part I, entitled Vocational Education, and in the May, 1965 issue of the Bulletin of the National Association of Secondary-School Principals in which nearly the entire volumes of both publications were devoted to elements of interest to all vocational areas. In similar fashion, the Vocational Education Act of 1963 denotes commonality among programs and expands the definition of vocational training.

It is apparent that local training programs, as well as state and national efforts, should be geared toward the current needs of workers. Graduates of education programs have emphasized that one of the most urgent and immediate needs is to evaluate professional education courses for locating excessive amounts of overlap and duplication (Gainor, 1965 and Preston, 1964). A principal method of approaching this problem is through occupational analyses, and vocational education has pioneered in the use of this research method (NSSE, 1965). Most studies devised to determine occupational curriculum have followed a time-tested format. The occupation is defined, a job or position analysis is performed, and skills and knowledges are abstracted from the identified tasks performed by the workers (Mills, 1966). On the basis of such task descriptions, educators may build educational plans

to teach abilities required for employment. The results of these types of studies have had obvious implications for program planning and curriculum development (NSSE, 1965).

Presently, as well as in the past, the training of agriculture and home economics teachers, and, to a great extent, teachers of distributive education, has been accomplished through programs which combine a broad base of occupational content with appropriate professional education. For trade and industrial education, persons with adequate occupational experiences have been employed with relatively little pre-employment professional training (U. S. Department of H. E. W., 1963). The mobility of teacher population has created a great need for uniform and nationwide teacher requirements for some disciplines (Heilman, 1963). However, program variations may occur because of differences in geography and climate as has been indicated in a U. S. Department of Health, Education, and Welfare study (1963) and in a study by Mills (1966).

If appropriate training programs are to meet these varying needs, they must be designed to fit the operating programs. However, the standardization of curriculums across the nation might well be practicable in many fields (U. S. Department of H.E.W., 1963). The Panel of Consultants on Vocational Education recommended that:

> Basic vocational education programs should be designed to provide education in skills and concepts common to clusters of closely related occupations. The curriculum should be derived from analysis of the common features of the occupations included. These students should receive specialized or more advanced vocational training later .....

Some educators feel that many of the experiences within the curriculum are similar and could be identical for all vocational students (Cross, 1967 and Knapp, 1965). Such a standardization in vocational teacher training might well be dependent upon the identification of the basic

elements or common core of experience among vocational training programs. A prolonged study of generalizations would, no doubt, reveal skill and knowledge areas common to agriculture and business and office education, to home economics and distributive or trade and industrial education, or to other such combinations (Cross, 1967). Specifically, the problem is centered on the classification of training needs for the various selected disciplines, which are common to and which cut across a variety of teacher preparation programs. If identified, these common elements of training could serve as the basis for developing programs for the preparation of vocational teachers. Hence, it is suggested that the challenge of the future, in order to meet rapidly expanding technological changes, will require preparation in which emphasis is placed upon a common understanding of principles.

EMPIRICAL STUDIES IN TEACHER EDUCATION

Recently, a few empirically-based studies have been attempted in specialized areas of vocational education. For the most part, these studies have dealt with curriculum problems associated with trade and industrial education, home economics education, and distributive education. Representative examples of these projects are given in this section of the report. Few, if any, empirical studies of curricula needs, which extend across the broad range of vocational teacher education, have been completed.

The ultimate objective of a research project being conducted by Crawford (1967) is to detemine the learning experiences that should be included in a distributive teacher education program. For the study, both pre-service and in-service activities are being analyzed in order to develop competency patterns needed by distributive workers to enter and advance in the distributive field. The findings will be useful to curriculum workers in the distributive education program as a step toward a useful curriculum model.

Walsh (1960), in a study designed to analyze 107 teacher competencies for Trade and Industrial Education instructors at the secondary level, utilized a Likert-type check list approach to data collection. The results of Walsh's study have proven invaluable as a guide in revising the Trade and Industrial Teacher Education curriculum.

Perhaps more germane to the present rationale is a study conducted by Courtney (1965) in which two groups of vocational teachers were utilized (1) to evaluate the effectiveness of the teacher education training programs at Stout State University, and (2) to evaluate the requirements of vocational teachers in the field in

terms of professional education requirements. The study encompassed graduates with none to ten years teaching experience, and included the study of a geographic area effect as well as a type of training program effect. Secondary level home economics teachers and trade and industrial education teachers were used as the population. A random selection of 120 individuals reacted to a sixty-four item check list. In all, fifty-four of the items studied showed commonality among the two training programs. For the most part, the geographic area effect and the experience level effect did not indicate significant differences.

Those items which rated highest by the respondents when they were asked to evaluate the requirements of the teacher in the field were:

(1). the ability to stimulate and maintain interest throughout the instructional process.

(2). the ability to motivate students to acquire skills.

(3). the ability to establish and maintain acceptable standards of discipline.

(4). knowledge of the methods and techniques of teaching.

(5). the ability to use a wide range of techniques and methods in teacing.

(6). the ability to construct objective tests to measure the student's achievement.

(7). the ability to analyze and organize subject matter into instructional units.

(8). knowledge of the individual differences in the learning process.

(9). knowledge of the procedures for evaluating and recording student achievements.

(10). the ability to organize and develop a curriculum around

useful and meaningful units of experience.

For the sixty-four items studied, those ten requirements which were rated lowest by teachers were:

(1). knowledge of the history of education.

(2). knowledge of state and federal report forms.

(3). knowledge of the role of advisory committees in education.

(4). knowledge of the role of the school in helping students reach physical, social, and emotional maturity.

(5). knowledge of the principles of adult education.

(6). knowledge of the important features and maintenance requirements of projection equipment.

(7). knowledge of the professional groups (NEA, AFT, etc.) in education.

(8). knowledge of the role and importance of extra curricular activities.

(9). knowledge of the operation of duplicating equipment.

(10). knowledge of the responsibility of the teacher in the guidance program.

Most of the items which were rated highest for this study were those which are related to methods and techniques of teaching. Those items which scored high are those which teacher educators would rationally place high on the requirement list for training programs for teachers. Thus, it would seem logical that teacher educators should consider placing the greater emphasis in training teachers with the items rated in the high categories. The implications for this study revealed that the content of courses scoring low should be re-evaluated in terms of expressed needs of graduates in the field.

In extending the Wisconsin study more broadly, Courtney (1967),

in an Office of Education-funded study, developed a list of knowledges and abilities which could be used to inventory the core of professional activities required in training programs for vocational teachers of Trade and Industry, Home Economics, Distributive Education, Vocational Agriculture, and Business. For the study, 200 knowledges and abilities relating to professional education training were compiled, utilizing an inspection of college course syllabi and consultant panels of vocational teachers and teacher educators to validate the resulting items.

Several workers have research in progress which may develop curriculum informations pertinent to the present study. All are approaching the curriculum problem in vocational education, each worker looking at different facets of the commonality and/or competency issue.

Franz (1966) is in the process of developing a teacher education curriculum which will encompass the skills and knowledge required for teaching identified occupational clusters. One of the objectives identified for the study includes the preparation of curriculum materials and procedures for the purpose of training vocational teachers for experimental programs in each of the three occupational clusters of construction, metal forming and fabrication, and electro-mechanical installation and repair. The use of rational criteria for the study makes this approach different from that which most workers have used in developing clusters. Perhaps a more empirically based design for the Maryland work would add to the validity of the findings. For the study, tasks will be classified according to the human requirements for performing each task. The human requirement categories which, it appears, have been arbitrarily selected are (1) skills, (2) mathematics, (3) measurement, (4) science, (5) communication, and (6) information.

The human requirements for each task will be stated in behavioral terms. From these categories, the job clusters are to be developed on the basis of frequency with which jobs are described by human requirement behaviors.

APPROACHES TO DETERMINE COMMON CONTENT AND BEHAVIORS FOR PROGRAMS

Basic to the establishment of empirically designed studies for determining content for educational curricula are those studies in job classification and common behavior. Likewise, studies conducted for secondary and post-secondary programs formulate some bases for determining common program behaviors and content. These studies are reviewed below.

Job Classification Studies

Sjorgen and Sahl (1966) have developed an extensive review of research on job analysis in connection with their study which proposes to identify visual, manual, and communicative skills common to a variety of occupations. The basic premise followed by these researchers is that vocational curricula designed to teach skills, knowledge, and understandings relevant to a number of jobs followed by specific training for a single job are more efficient and effective than vocational curricula designed to teach certain specific jobs. The rationale presented by these workers is ratified in the introductory portion of the Sjorgen and Sahl report.

> Rather than attempting to define a general vocational curriculum on a rational basis, the more reasonable approach is to define a general vocational curriculum on the basis of observable similarities among jobs in terms of skills, abilities, tasks, and competencies. With such an approach, job clusters would be identified or defined on the basis of each job in the cluster having relatively high commonality of required skills, tasks, abilities, and competencies with the other jobs in the cluster. The general vocational course for this job cluster would then be designed to teach the factors common to those jobs in the cluster.

> The training for specific jobs would follow the general course and would consist primarily of experiences designed to teach those specific factors not included in the general curriculum... The first step in developing a general course or curriculum is that of identifying job clusters (p. 4).

Considerable research has been done which relates to job clustering and to the identification of elements common to a number of jobs. In a recent survey by Olson (1965), which studied job families, it was found that over one-half of all the subject matter necessary to qualify for entry level employment is common throughout all the jobs within an occupational family grouping.

Primary to the research in education has been the work done in industrial psychology at Purdue University and elsewhere which has dealt with patterns of job requirements. Much of the work at Purdue has been directed toward the classification of jobs according to requirements and has analyzed a commonality among job as the criteria for classification.

Basic to the curricula studies have also been the concepts of classifications for systemitizing the Dictionary of Occupational Titles described by Fine (1951), Studdiford (1951), Finn (1954), Schieps (1954), Fine (1955), and McCormick, Finn, and Schieps (1957). These workers have been concerned primarily with patterns of job requirements, and in attempting to classify jobs on the basis of certain factors that emerged from components used by the U. S. Employment Service in the Functional Occupational Classification System. According to the McCormick, Finn, and Schieps report (1957), it was found that there was present "...a strong concentration of jobs in a very limited number of the various possible patterns (p. 363)."

Other studies which appear to be basic to the present rationale

have been those relating to the classification of office occupations. For this review, two studies, which had similar results, are reported. The first, a study by Thomas (1952), identified groups or clusters of similar operations in a sample of office jobs. For the study, a 139 item check list of basic office operations was completed by clerical personnel with some eight operations clusters being identified as a result.

The second study, by Chalupsky (1954), acts as an agent for relating the foundational studies here presented to the proposed curriculum work at hand. The principal objective of this study was to analyze clerical jobs to determine common worker functions and knowledge requirements.

Each of the studies cited above denoted a possible overlap or "clustering" of factors studied, thus indicating the feasibility of projecting the approaches, or modifications of them, to other problem areas.

Common Behavior Studies

Research has tended to support the view that work activities can be identified and measured. Palmer and McCormick (1961) factor analyzed a 177-item worker-oriented activities check list which was organized generally along lines suggested by information theorists (i.e., with categories of input, decision, storage, and output). The behavioral activities included for the check list attempted to measure how the worker used technological factors to achieve certain ends. The results of the study indicated that human work activities may be more simply and economically organized in terms of smaller numbers of relatively independent dimensions.

Drawing upon the previous work which was done with job classification, Courtney (1962) designed and conducted a study to determine the extensiveness of common components among three agriculturally-related occupations. Here it was contended that relatedness refers to related abilities and what the worker does on the job was made the criterion for classification, rather than where the worker was employed. Thus, occupations requiring workers with similar knowledges would be classified together within the same occupational "cluster". In this approach there is a search for a common core, with overlapping circles representing related occupations, showing common and/or differentiated elements (worker job requirements). Curriculum planning is centered on identifying the elements of the core. As stated in the Courtney and Coster (1963) report:

> The core of the instructional program, therefore, is the abilities required....Where there is no overlap, the occupation is not described as related...further, the specific abilities defined by the overlap are likely to be specific, rather than general (p. 32).

Following the Courtney and Coster studies, several researchers analyzed factors which dealt with curriculum and competency determinations for agriculturally-related occupations. One of the more relevant of these studies was done by Phipps and Fuller (1964) who factor analyzed activity and knowledge scores for agriculturally related occupations. Their results showed twelve activity factors and twelve knowledge factors that could be used in classifying agricultural occupations.

Other examples of factor analysis designed research projects include those by Stevenson (1965), Coster and Penrod (1965), and Coster and Courtney (1965). The Coster and Courtney (1965) study analyzed data which consisted of responses from ratings of each of 148

agriculturally oriented competencies needed by workers in three agriculturally oriented occupations; namely, farmers, farm real estate brokers, and grain elevator operators. The data were collected from forty randomly selected persons in each occupation. Six interpretable factors were identified through the factor analysis with three of the factors judged to represent the three occupations and the other three indicating some commonality among the occupations for agronomy, animal science, and mechanical knowledges. The occupational factors appeared as clear cut and easily distinguishable as common factors.

Studies in Secondary and Post-Secondary Education Programs

Vocational preparation at the secondary level has been retailored of late for many programs as changes have been directed toward the "cluster" concept of training. Shimberg (1966) suggests that in order to avoid asking students to make a premature commitment to any one training program that,

> .....this can be accomplished by offering courses with broad content during the tenth and eleventh grades, each of which begins preparation for a large range of occupations. Students who wished to prepare for employment in a specific occupation would then take courses with narrower content (p. 36).

Kansas State University is attempting to develop a coordinated program of vocational education, one part of which is based upon common and differential aspects of vocational education subjects. The program organization will include preparation in a secondary school in Kansas as well as occupational information selection by secondary school students.

American Institute for Research workers, experimenting with training for occupational "clusters" in the Quincy, Massachusetts schools, are analyzing job behaviors, as they relate to knowledge and

skills (Morrison, 1966). The object of this research is to determine what workers actually do on the job in an effort to develop a training program which parallels the job entry need. The occupations being studied are:

1. Electromechanics
2. Metals and machines
3. Power mechanics
4. General woodworking
5. General piping
6. Foods preparation
7. Computer data processing
8. Health occupations
9. Graphic and commercial arts
10. Home Economics
11. Business education

The primary objective of the research is to establish which minumal skills are needed for entry into jobs ranging across occupations being studied. If the focus is upon a broad cluster of skills, it will be possible for the student to enter various levels of jobs, depending upon the time he spends in training and the progress which he makes in his training. Thus, even the student who has only been in the curriculum for a short while will be trained for some job in the hierarchial job ladder.

Another experimental training program, called the Richmond Plan after the Richmond, California schools where it has been tested, features the integration of technical and academic subjects. For the program, students who were failing their subjects, but who had reasonable skill in reading, were chosen to participate in the project.

When modifications were made in the instructional methods so that the integration of theory and practice took place, students developed both academic and technical skills to the extent that they were prepared to take jobs in industry or to qualify for apprenticeship training. The Richmond Plan is presently being extended to a number of other secondary schools throughout the country.

Content studies are being widely utilized with the general objective being to identify clusters of activities for multitudes of jobs. At least three studies have recently been conducted at Washington State University and at the University of Idaho which have objectives pointing toward curriculum makeup. Similarly, work at Virginia Polytechnic Institute has been conducted with the same objective in mind.

The Washington State University groups have as the major purpose of their study the identification of clusters of knowledge and competencies most likely to maximize the career-long occupational opportunity, competence, and choice of non-college bound youth in our society. For the study, the occupational areas of office, general merchandise retailing, building trades, electronics, food service, and child care were selected. Bakamis, et al. (1966), as a part of the project, obtained information about major types of tasks performed by workers in ten building trades, determined clusters of knowledges and competencies associated with effective performance of work within each trade, and identified clusters of knowledges and competencies common to work in two or more of the trades. Trades selected for the study were:

1. Bricklaying

2. Carpentry
3. Cement finishing
4. Electrical work
5. Iron work
6. Painting
7. Plastering
8. Plumbing
9. Roofing
10. Sheet metal and heating

The above trades were selected because it was felt that such work would likely provide income-earning opportunities for substantial percentages of non-college bound youth. The results indicated that the clusters derived from the study provide a partial base for planning curricula likely to help pupils acquire knowledge useful for work in the building trades. Through such studies, both curricula planners and teachers can be made aware of knowledge associated with tasks presently performed by building trade workers.

Mills (1966) conducted another phase of the Washington State University project which had as its purpose the identification of specific knowledges and clusters of knowledges most widely utilized in major types of work commonly done by electronics technicians. It was assumed that the identification of useful knowledges would provide a partial base for curriculum development. Knowledges reported to be necessary for performing tasks were grouped to assist schools in planning training for electronics technicians.

Still a third part of the studies conducted in the Northwest was completed by Ertel (1966) at the University of Idaho. Ertel's

research had as its major purposes (1) the identification of facts about what major types of tasks were actually performed in major retailing occupations and (2) the identification of the major types of levels of knowledge most needed to prepare students for such work. The analysis suggested discrepancy between the types of work actually done and the content of some distributive education curricula. The results indicated that to prepare students with a background most likely to assure career long advancements, some advanced education preparing them to adapt a broad range of tasks was essential. Recommendations from the study were that:

(1). Similar studies should be conducted in other types of retailing, wholesaling, and service occupations and by other categories of employment within firms.

(2). Similar studies should be conducted in selected geographical locations to determine if there are regional differences in the tasks performed by non-supervisory and supervisory personnel.

(3). Comparisons should be made between the findings of this study and existing curriculums at the high school and post high school levels.

DIRECTION OF RESEARCH IN VOCATIONAL TEACHER EDUCATION

As a result of the thrusts of the recent Vocational Education Act of 1963 and in order to serve the needs of our growing technological society, institutions training persons for the world of work have been given added responsibilities as new targets have been opened for vocational education. As a result of the recent legislative action, programs no longer are restricted to the traditional, specific, and highly specialized services of vocational education. Consequently, vocational programs can now become involved with services which are more flexible and which cut across major and traditional vocational training lines. Because of these actions, innovations may now be brought to bear upon the common problems of vocational education.

The creation of new tactics directed toward training programs in vocational education has not come without need and justification. The new emphasis on occupational training for the world of work has resulted from a variety of situations which have come to exist within our society during recent years, some of the most influential of which have been the following factors:

1. Millions of secondary school youth, out-of-school youth, and adults need training or retraining in order to meet the demands of a spiraling, technologically changing labor market. Even with nearly three million potential workers unemployed, there are many jobs unfilled because the skills possessed by the unemployed are not compatible with the needed skills. As a result, serious manpower shortages exist

in certain occupations (Morgan and Bushnell, 1966).

2. A technologically changing society requires that adaptations be made, not just in the skills training of workers, but also in the efficiency with which the production of training progressees. Not only are more teachers needed, but they must be capable of translating the needs of the world of work to the trainees working under them. Teachers must be able to provide today's youth with the kind of education which will permit them to enter the labor market and remain qualified on the job. It is particularly important that curriculums are developed in accordance with the performance requirements of the job.

3. Vocational training for the world of work must be provided at all levels of education. There is a scarcity of teachers of vocational subjects who are knowledgeable about the changing world of work. Therefore, it is imperative that attention be focused upon the pre-service training programs for vocational teachers in order that instruction be improved.

Among the controlling purposes of the Vocational Education Act of 1963 are those provisions which assist the States to maintain, extend, and improve existing programs of vocational education. The provisions of the Act cover the training of persons engaged as, or preparing to become, vocational teachers.

During recent years, vocational educators, in increasing numbers, have advocated broadening the training base in preparing teachers of vocational subjects, both in terms of the clientele to be accomodated and in terms of the objectives within the training programs themselves. A review of the literature reveals that questions are being raised in teacher education. Essentially, the arguments advanced for

expansion of training program planning has the effect of defining the work of the teacher in conceptual terms. The production of the worker who is occupationally oriented is a major concern of employing officials and in meeting the current demands for workers (teachers) possessing such qualities. If workers entering the vocational trades are to be properly oriented to the world of work, they must be instructed by teachers who are themselves properly trained to relate an occupational philosophy.

Hence, it is essential that teachers are made aware of the various types of entry-level occupations now available to youngsters who are planning to enter the labor market. Under the present vocational teacher training curricula, trainees have little opportunity to acquire a knowledge of the functionings of the business and industrial community. Thus, many teachers of vocational subjects are unable to relate general occupational problems with their pupils.

Presently, as a result of Federal legislation, and also from the pressures which employing officials are placing upon workers, teacher training institutions are being encouraged to provide today's teacher trainees with the kind of educational experiences which will qualify them for coping with the modern problems and needs existing within the work society. It is important that the emphasis for program changes center upon determining the kinds of experiences which relate to the organization and direction of programs for training students for world of work activities. Educational research workers, teacher educators, and teachers of vocational subjects, working together to determine the changes which are needed for developing teachers of occupational subjects who can operate within the framework

of present emphases, should shed valuable light upon solutions to the present problem.

Attempts have been made to approach the change problem in integrating specialized services in occupational education. The new centers for research, development, and training are organized to coordinate across-the-board efforts in order to look at broad problem areas in vocational-technical education. Likewise, many state divisions of vocational education have developed training programs which cut across broad service lines. The next feasible step is to have the teacher training institutions appropriate changes in their pre-service programs in order to upgrade workers in better preparing them for their employment in the field.

Several teacher training institutions have already developed programs which are organized with the objective of pulling the various services together. At Rutgers University, they have developed a core-type curriculum at the Master's level and are bringing students from the various services together. They are also mixing faculty. Courses which are mixed include curriculum materials and methods, educational psychology and measurement, evaluation, and concepts in vocational and technical education.

Another interesting development at Rutgers has been the incorporation of a supervised teaching program at the undergraduate level which cuts across service lines. For this portion of the training, one may find industrial educators calling on agricultural education student teachers or vice-versa.

Washington State University is in the process of developing a comprehensive and integrated program of vocational teacher preparation.

The general idea behind their planning is to develop a program which will provide all teachers with some background in vocational education. Those specializing in vocational education would all take a few common core courses with the hope that agriculture teachers, trade and industry teachers, and business education teachers could be trained under the integrated arrangements. Likewise, there is speculation that office and distributive occupational education might also be integrated for training purposes.

Several southern vocational teacher training institutions have moved toward an integration of services for their programs. Examples of programs with comprehensive departments of vocational-technical education include those at the University of Kentucky, Louisiana State University, Auburn University, and Virginia Polytechnic Institute.

At the University of Illinois, vocational faculty and students have been organized in a core-type curriculum structure similar to that of Rutgers with a Vocational and Technical Education Department acting as the cohesive administrating agent. At Illinois, some courses have also been programmed to cut across service lines.

While much of the research to date on the subject is fragmented, some has been directed toward the development of new models for teacher education. At the same time, many teacher training programs have attempted to modify their curricula to conform to modern needs. The teacher of occupational subjects, like his students, not only needs to know the basic skills involved with teaching his specialty, but he must also know about the world of work and the role his trainees will play in society after they matriculate from training.

It would seem logical to assume that training requirements

should include academic training as well as occupational orientation training, along with the components which develop the individual for the personal capacities necessary for teaching.

Desirable Changes

If we are to speculate that the teacher of occupational subjects is going to be able to organize and direct programs for training people to enter the world of work, we will expect that he should be capable of:

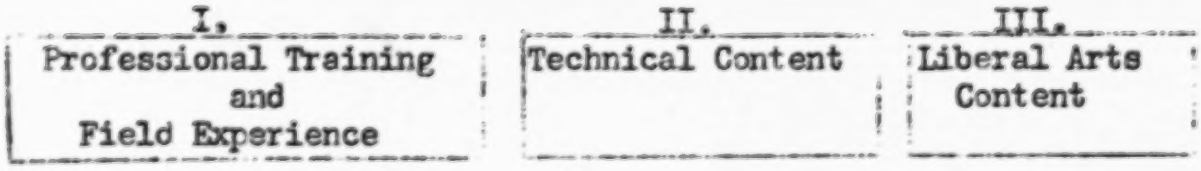
1. directing learning experiences within a democratic society.

2. understanding and applying the basic principles underlying occupational preparation.

3. operating within a specialty area of work.

In accord with these capabilities, the characteristics of the trained teacher should include (1) flexibility, (2) adaptibility, and (3) a thorough grounding in learning theory, sociology of education, and the processes of people's interest in work.

From the results of previous work and based upon an expressed need for research in education, it would appear that there should be developed a quantitative basis for making judgments on content to be included in vocational teacher training programs. Further, it would seem that vocational teacher education should be looked at in terms of the three basic blocks of training content shown below:



Under this arrangement, the principal thrust for future training emphasis

would be toward the development of a teacher of vocational subjects who is occupationally oriented. From the viewpoint of teacher educators, it would be valuable to know the qualities and the parameters inherent for the basic blocks of content here presented.

The central issue is the development of a model for vocational teacher education which will indicate the content of training needs for teachers of occupational subjects. The basic thesis surrounding this issue is that a standard set of dimensions should be developed which will give guidance to content selection in the training of vocational teachers.

Recently Sedgewick (1967) has developed a teacher model which structures the available research into a form which provides guidance for curriculum development. Although the model is flexible, empirically-based research is needed to validate substantial positions of the matrix. The classification system presented by Sedgewick for the various teacher dimensions is shown below:

TEACHER MODEL

	Supported by Consensus 1	Supported by Empirical Data 2
modifiable	1.1.1 _____ 1.1.1.1 _____ 1.1.1.2 _____ 1.1.2 _____ etc.	1.2.1 _____ 1.2.2 _____ 1.2.2.1 _____ 1.2.2.2 _____ 1.2.3 _____ etc.
not modifiable	2.1.1 _____ 2.1.2 _____ 2.1.3 _____ etc.	2.2.1 _____ 2.2.2 _____ 2.2.3 _____ etc.

The model above formulates the basis for analyzing the various dimensions of teacher education and focuses on the content which may be selected for study.

Commonality of Content

The suggested basis for curriculum planning in occupational education programs is to search for a common core of training experiences which will lead to the development of competent teachers of vocational subjects. Using the centripetal approach (cf. Courtney and Coster, 1963), curriculum planning is centered on identifying the elements of the common core. The elements are likely to resemble fragments of abilities or knowledges and are apt to be general rather than specialized except as specialization may relate to the entire field of vocational education. This approach may appeal to educators who see the need for cooperative training programs of teacher education.

A summary of the literature validates this approach as the theoretical framework under which this problem may be studied. Acccrding to this premise, the following resumes may be used as guiding principles in the crganization of an empirically-based procedure for determining vocational teacher curricula content.

1. Factor identification may be accomplished using as a base an occupational groups classification system. Such identifications reveal areas of differentiation among workers.

2. Job requirement components provide for large spectrum analysis descriptions of worker (teacher) populations. Through such descriptions, components of training program preparation needs may be studied.

3. Subject matter content may be descriptively grouped for

analysis purposes. From such groupings, patterns of training may be established for workers in vocational teaching so that the basic common elements and necessary common experiences among training programs can be identified.

As content is identified, behavioral objectives associated with the curricula for training teachers of occupational subjects can be specified. Using the sequences of behavioral objectives, instructional strategies may then be identified for the training programs of occupational teachers.

In order to reveal more specifically the procedure which is here suggested, a research model has been developed which alines itself with the previously stated rational. The following model directs itself toward the identification of training content required by vocational teachers and draws from the professional training block of instructional needs. The model here presented might well be used for purposes of assessing the professional block needs of training programs in occupational education.

THE RESEARCH MODEL

The theoretical construct of this approach may be translated into an appropriate set of objectives which reveal the nature of the problem's description. In analyzing the various factors related to the needed research, the following objectives are given:

1. To determine the content of professional education needs for teachers of vocational subjects.

2. To determine the competency levels required for the professional education needs of teachers of vocational subjects.

3. To extract the common core of subject matter for professional educational needs and training elements being studied in order to terminally develop a listing of common professional education training needs for teachers of vocational education.

Hence, the questions to be answered as a result of this line of inquiry include the following:

1. What are the professional education training elements needed in the field by teachers of vocational subjects?

2. What are the common professional training needs for teachers of vocational subjects?

3. What competency levels are necessary for teachers in the field for the subject items considered by the study? What is the importance level for each component studied?

4. Is there any indication of grouping for the training elements being studied?

5. What modifications need to be made in the existing structure for vocational teacher training with regard to content in professional education?

The present approach, concerned with identifying and analyzing the common core of experiences among vocational training programs, features the identification of populations, the selection of a stratified-random sample of respondents, the construction of a data-collecting instrument, and the analysis of the collected data using appropriate analytical comparisons. The specific procedures for the approach are outlined below:

A. General Design

The general design is patterned after the studies outlined previously for related curriculum and teacher training needs. Modifications from these design patterns have been initiated to include the following:

1. The population for the study may be drawn from vocational teachers representing the following disciplines:

   a. Trade and Industrial Education

   b. Business Education

   c. Home Economics Education

   d. Vocational Agriculture Education

   e. Distributive Education

Data may be collected from teachers who represent each discipline.

2. In studying commonalities among vocational training programs, a factor analysis treatment may be employed.

This step in the research is considered as one of the most important aspects of the proposed research and is expected to provide data answering questions relating to the central issues of the investigation. The principal objective of this step is to identify items which fall under the factors resulting from the analysis, with the

resultant items comprising scales which describe the factors upon which the items load.

The multiple group procedure described by Wherry and Winer (1953) may be utilized for the factor analysis. The steps in the analysis are as follows:

a. Items are sub-grouped by a jury of consultants prior to the factor analysis. Correlations are then examined for relationships between items and groups of items into which they have been placed. A 130 item x 10 factor matrix may then be analyzed to identify items which load under resulting factors.

b. A 130 x 10 matrix may be factor analyzed separately for each of five (5) disciplines to see if items load separately for each discipline. One hundred (100) respondents per discipline may be randomly selected for use in this step. Such an analysis will follow the matrix established below:

130 ITEM X 10 FACTOR MATRIX
USING 100 RESPONDENTS/DISCIPLINE

	FACTOR I					FACTOR II					. . . . .	FACTOR X				
	Disciplines					Disciplines						Disciplines				
	A	B	C	D	E	A	B	C	D	E		A	B	C	D	E
ITEMS																
1																
2																
3																
.																
.																
130																

Factor loadings

Factor pure scales may be developed from items which load the same across disciplines.

3. Other tests may be made, utilizing analysis of variance techniques, in order to locate specific differences for individual scales among the disciplines under investigation as well as to analyze the effects of geographic location and interaction.

For each scale, the major hypothesis of interest to be tested for each of the items included in this example is:

1. There is no discipline factor effect.

Subsidary hypotheses included due to the mixed model approach in the design are:

2. There is no geographic location factor effect.

3. There is no interaction effect between disciplines and geographic location.

Data may be analyzed by the analysis of variance. The test statistic is the F statistic and the critical region for the test of the hypothesis is the theoretical value for indicated degrees of freedom at the 1 percent level of significance. Expected mean squares may be derived for each of the sources of variation as follows:

Source of Variation	Degrees of Freedom	Mean Square	Expected Mean Square
States	9	A	$\sigma^2 + 50 \Phi S$
Disciplines	4	B	$\sigma^2 + 100 \Phi D$
States & Disciplines	36	C	$\sigma^2 + 10 \Phi SD$
Respondents	450	D	σ^2

From the expected mean squares, the appropriate tests of hypotheses may be made by evaluating the variances of the sources of variations appropriate to each hypothesis. The test statistic in each

instance will be the F statistic. Further information regarding tests of hypothesis is given below:

Hypothesis	df	F=	α-level	Critical Region
1	4,450	B/D	.01	F > 3.36
2	9,450	A/D	.01	F > 2.46
3	36,450	C/D	.01	F > 1.74

B. Population and Sample

The respondents for the study may be made up of ten secondary school vocational teachers randomly selected from each of five arbitrarily-selected disciplines and from each of ten arbitrarily-selected states. Hence, the sample which will represent the population for the study would arrange itself in the following manner:

DISCIPLINES (FIXED)	STATES (FIXED) 1	2	3	4	5	6	7	8	9	10
I	S_{1-10}*	S_{11-20}	S_{21-30}	S_{31-40}	S_{41-50}	S_{51-60}	S_{61-70}	S_{71-80}	S_{81-90}	S_{91-100}
II	$S_{101-110}$	$S_{111-120}$	$S_{121-130}$	$S_{131-140}$	$S_{141-150}$	$S_{151-160}$	$S_{161-170}$	$S_{171-180}$	$S_{181-190}$	$S_{191-200}$
III	$S_{201-210}$	$S_{211-220}$	$S_{221-230}$	$S_{231-240}$	$S_{241-250}$	$S_{251-260}$	$S_{261-270}$	$S_{271-280}$	$S_{281-290}$	$S_{291-300}$
IV	$S_{301-310}$	$S_{311-320}$	$S_{321-330}$	$S_{331-340}$	$S_{341-350}$	$S_{351-360}$	$S_{361-370}$	$S_{371-380}$	$S_{381-390}$	$S_{391-400}$
V	$S_{401-410}$	$S_{411-420}$	$S_{421-430}$	$S_{431-440}$	$S_{441-450}$	$S_{451-460}$	$S_{461-470}$	$S_{471-480}$	$S_{481-490}$	$S_{491-500}$

* S_{1-10} represents ten (10) randomly selected respondents.

In each instance, ten (10) individuals ($S_1 \ldots S_{10}$) may be randomly selected for each cell with a total of 500 individuals (teachers) being involved in the sampling. The ten (10) states to be utilized in this example, as shown in Figure 1, are:

1. Illinois
2. Wisconsin
3. New Jersey
4. Ohio
5. Nebraska
6. North Carolina
7. Mississippi
8. Iowa
9. New Mexico
10. Oregon

Hence, the basic experimental design for the analysis of variance is a 5 x 10 factor matrix in which both the states factor and the disciplines factor are fixed. The respondents factor are random. The mathematical model is:

$$Y_{ijk} = \mu + S_i + D_j + SD_{ij} + R_{k(ij)}$$

where, μ is a fixed but unknown constant,

S_i is a differential effect associated with the states level,

D_j is a differential effect associated with the disciplines level,

SD_{ij} is a differential effect associated with classification factors of interaction, and

$R_{k(ij)}$ is a random variable with mean 0 and variance σ^2.

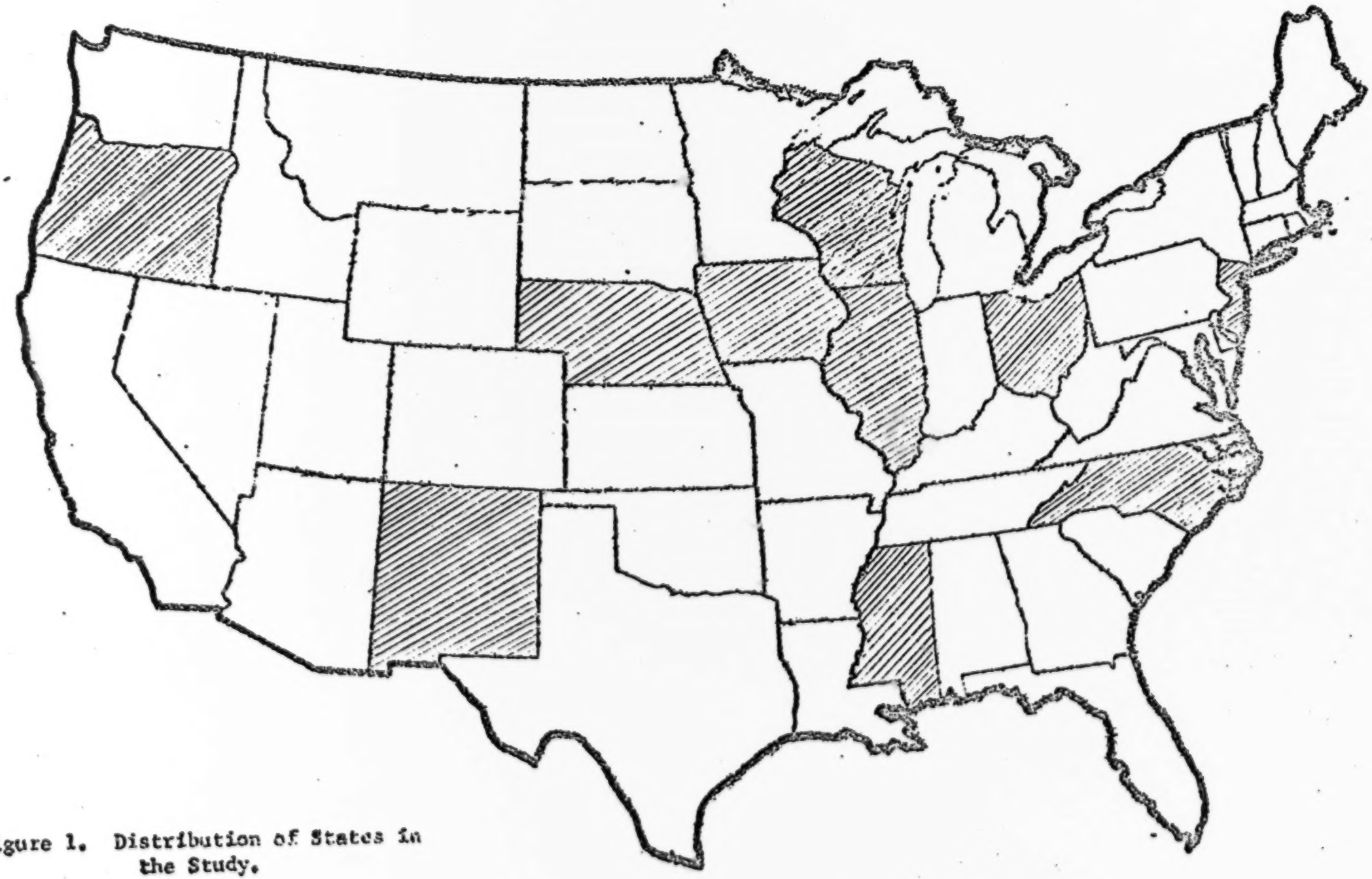


Figure 1. Distribution of States in the Study.

SUMMARY

The position here presented has generated a rationale and a design for planning a conceptual basis for developing common curricula in vocational teacher education training programs. Keeping curriculum content current is one of the most difficult problems facing vocational education today. The present approach is directed toward meeting the basic demands of the profession and has been focused on the development of a unified design for training programs in vocational education.

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